M68HC705F32PGMR/D
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M68HC705F32PGMR
PROGRAMMER
USER'S MANUAL

Freescale Semiconductor, Inc.

Third Edition

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CHAPTER 1.

INTRODUCTION

This manual describes the procedure used to program and verify the MC68HC705F32 microcontroller (MCU) on the M68HC705F32PGMR. All that is required to program the MCU is the PGMR, +5 volt and V_{pp} dc power supply, and a pre-programmed EPROM (parallel mode).

The PGMR supports 100 pin thin quad flat pack (TQFP) and 80 pin thin quad flat pack (TQFP) MCU programming by provision of two adapters.

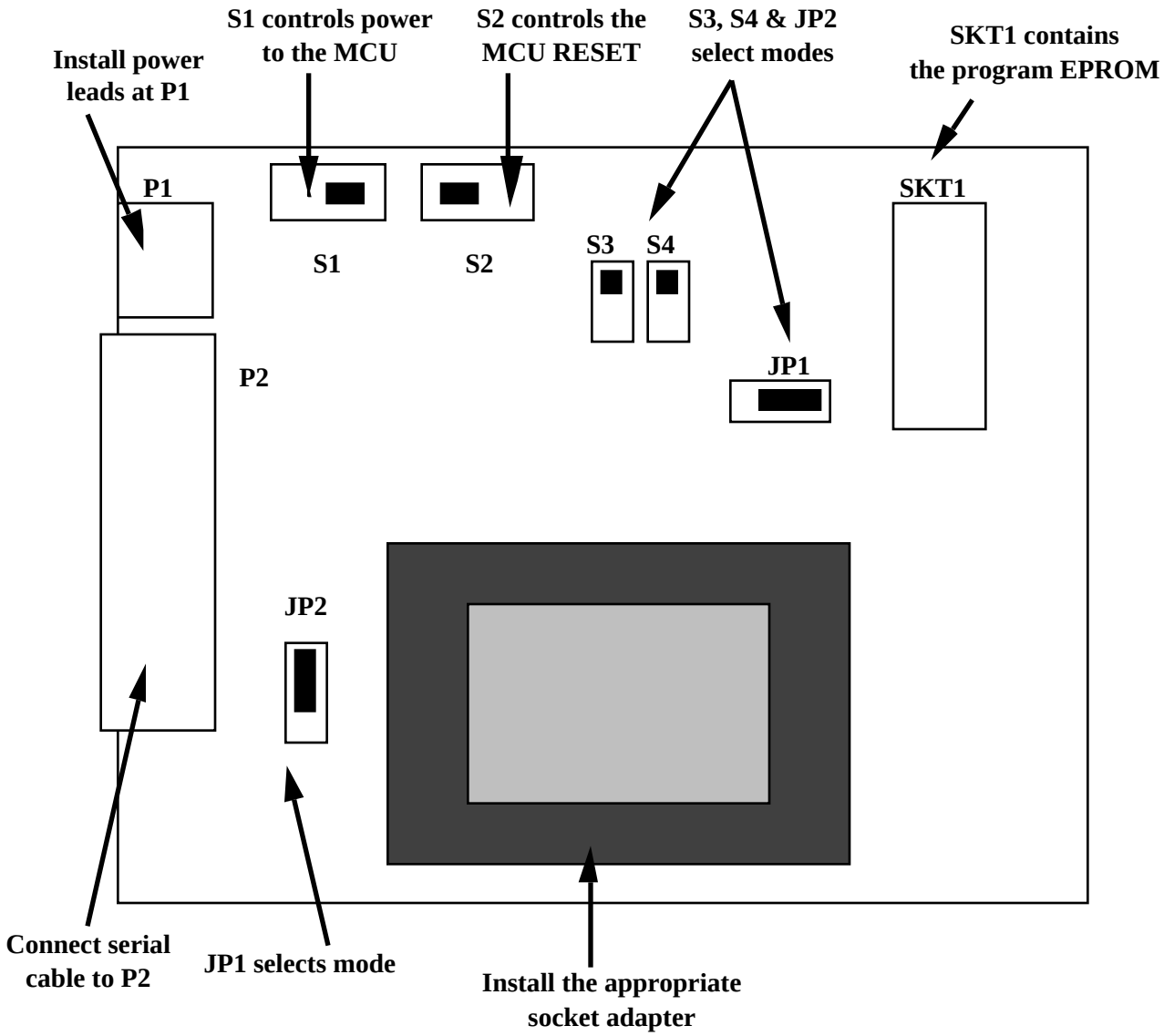

Figure 1.1 M68HC705F32PGMR Layout

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1.1 BOARD LAYOUT AND DESCRIPTION

Figure 1.1 shows the layout of the PGMR. As shown in the figure there are various controls, connectors and sockets that provide the ability to configure the board to specific MCU programming requirements.

For the board to function correctly you must supply the required power to the board at connector P1. +5V dc @ 100mA and ground lines are required. In addition a V_{pp} power supply is needed to perform the programming. The value of this supply may vary between MCUs, please refer to this manual and the device data book for further information.

Switches S1 and S2 control the activity of the PGMR. S1 is a simple on/off switch that applies power to the MCU device when on. Never remove or install an MCU when the S1 switch is in the ON position. S2 control the MCU reset line. Programming cannot take place while the part is in reset mode.

Two jumper headers (JP1 and JP2) and two switches (S3 and S4) configure the PGMR for the particular MCU and function in use. They select between different EPROM sizes, and modes. The following sections describe how to configure these jumpers for your programming requirements.

Lastly, socket U4 allows for the installation of the master EPROM. Socket U5 allows the installation of two adapter boards (provided). Each adapter board allows the programming of a single MCU. One adapter board supports the 80 TQFP package and one the 100 TQFP package.

IMPORTANT NOTE

Ensure the package adapters boards are orientated correctly onto the main PGMR board. Always ensure that the devices are orientated correctly into their respective sockets.

1.2 PROGRAMMING MODES

The PGMR supports two modes of programming. In parallel mode the user programs the MCU by copying the contents of an EPROM in U4. See chapter 2 for instructions. In serial mode the user communicates directly with the MCU via a serial cable and connector P2. See Chapter 3 for instructions.

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CHAPTER 2.

PARALLEL MODE

This programming mode copies a user program contained in an external EPROM, into the internal PROM (OTPROM/EPROM/EEPROM) of the MC68HC705F32 MCU.

2.1 68HC705F32 PARALLEL PROGRAMMING MODE

Settings required:

JP1	256 if **27C256** installed 512 if **27C512** installed	JP2	Parallel
S3	OFF	S4	OFF
S1	OFF	S2	IN
U4	**27C256** or **27C512** EPROM Installed		

2.1.1 Programming Procedure

a) Apply power to the PGMR board.

b) Insert the 705F32 MCU device into the PGMR.

c) Set S1 to ON.

d) Set S2 to OUT. The selected programming routine is then executed.

e) Once the programming is complete (see section 2.1.2), set S2 to IN and S1 to OFF. You may now remove the MCU from the socket.

2.1.2 Notes on the Programming Operation

In the program MCU PROM routine, the contents of the external 32K EPROM are copied into the MCU PROM areas of the applicable device. There is a direct correlation of addresses between the two devices. Non-MCU PROM addresses are ignored so data contained in those areas are not accessed. Unprogrammed external EPROM address locations should contain $00 to speed up the programming operation. During the programming routine, the PROGRAM LED D2 is illuminated. At the end of the programming routine, D2 is turned off, and the verification routine is entered. If the contents of the MCU PROM and external EPROM exactly match, then the VERIFY LED D3 is illuminated.

During the verification routine, all locations are compared to the data residing in external EPROM. The verification routine will stop if a discrepancy has been detected and the error address location will be placed on the external memory address bus.

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2.2 68HC705F32 PARALLEL VERIFICATION MODE

Settings required:

JP1	256 if **27C256** installed 512 if **27C512** installed	JP2	Parallel
S3	ON	S4	ON
S1	OFF	S2	IN
U4	**27C256** or **27C512** EPROM Installed		

2.2.1 Programming Procedure

a) Apply power to the PGMR board.

b) Insert the 705F32 MCU device into the PGMR.

c) Set S1 to ON.

d) Set S2 to OUT. The selected verification routine is then executed.

e) Once the programming is complete (see section 2.2.2), set S2 to IN and S1 to OFF. You may now remove the MCU from the socket.

2.2.2 Notes on the Verification Operation

The verify MCU PROM contents routine is normally entered automatically after the MCU PROM is programmed. Direct entry of this mode will cause the MCU PROM contents to be compared to the external EPROM contents residing at the same address locations. Both D2 and D3 LEDs are turned off at this time until verification is completed. Upon completion of the verification routine (every location verified) the VERIFIED LED D3 is illuminated. If D3 does not illuminate, a discrepancy has been detected and the error address location will be placed on the external memory address bus.

NOTE

MCU PROM blank checking can be accomplished by placing $00 into the external EPROM (SKT U4) and following the above verify MCU PROM routine.

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CHAPTER 3.

SERIAL MODE

This programming mode allows the user to download an S-record format file directly into the MCU by using an external computer system. The following sections describe the procedure taken to program each MCU type.

3.1 MC68HC705F32 SERIAL PROGRAMMING MODE

Settings required:

JP1	256	JP2	Serial
S3	OFF	S4	OFF
S1	OFF	S2	IN
U4	**no** EPROM installed	P2	Serial cable to PC

3.1.1 Software Requirements

SERPGM.EXE Revision V0.60.

3.1.2 Hardware Requirements

The hardware requirements to run the SERPGM program are as follows:

1 x IBM® PC Compatible Personal Computer
1 x Serial Port
1 x Connecting Cable

3.1.3 Programming Procedure

a) Apply power to the PGMR board.

b) Insert the 705F32 MCU device into the PGMR.

c) Set S1 to ON.

d) Set S2 to OUT.

e) At the PC prompt type SERPGM

f) Select either **1** for EPROM programming or **2** for EEPROM programming.

g) Enter the name of the S-record whose contents you wish to copy into the internal memory.

h) The program displays the progress of the programming procedure. Any errors are flagged to the screen. You may terminate the programming procedure at any time by typing (CTRL) D.

i) Once the programming is complete (see section 3.1.4), set S2 to IN and S1 to OFF. You may now remove the MCU from the socket.

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3.1.4 Notes on the Programming Operation

The sequence of events noted above must be followed or the MCU will not program. Errors in programming EPROM are normally caused by an incorrect EPROM V_{pp} value. Take care not to exceed the recommended value.

If the program is unable to communicate with the MCU the screen remains blank rather than displaying memory program progress.

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APPENDIX A

A.1 SERIAL PROGRAMMING CABLE

The following pages give details of a serial programming cable . If a nine way connector is used the signals must be mapped correctly.

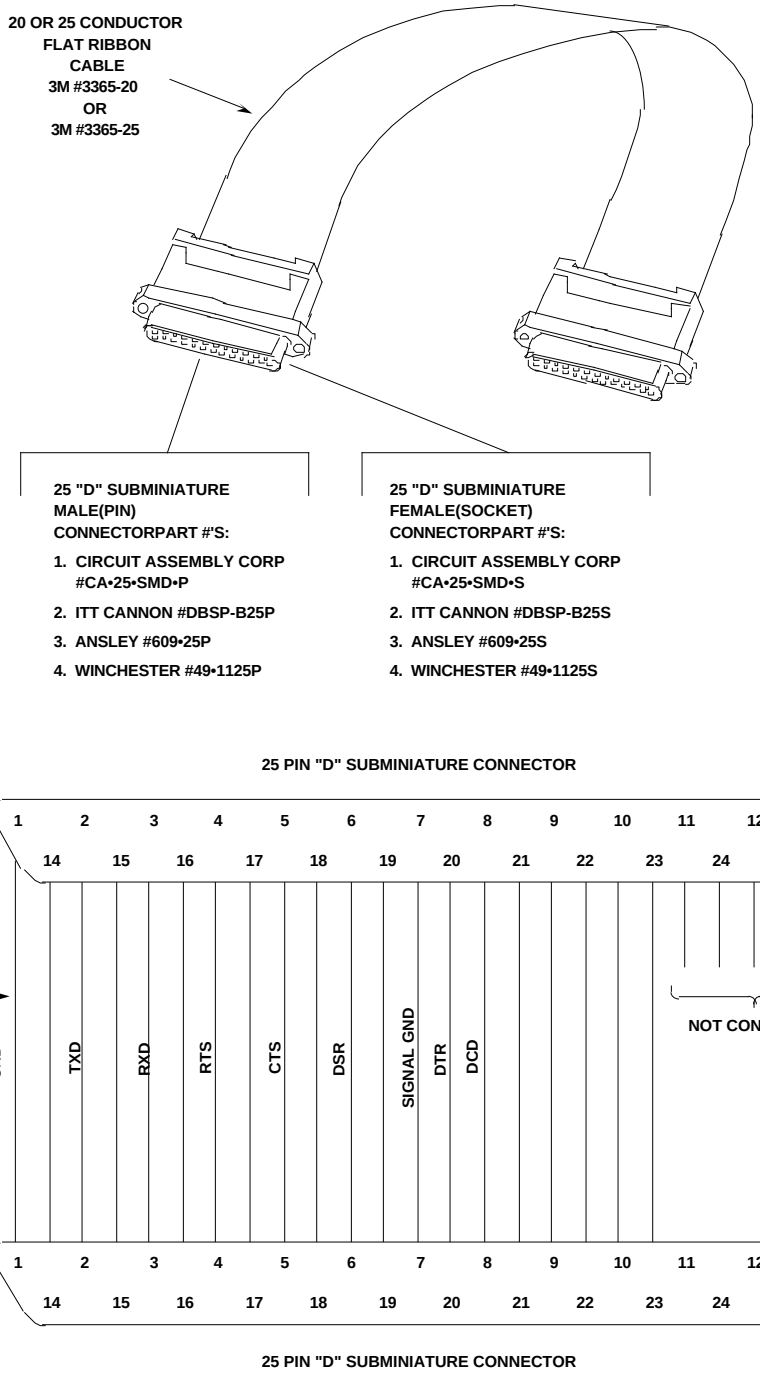

FIGURE A-1. PGMR/Host Computer Cable Assembly Diagram

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A Hayes compatible modem cable, purchased from a local computer store, can be used to connect the PGMR to the host computer.

The PGMR is wired as data communication equipment (DCE) whereas a terminal and most serial modem ports on host computers are wired as data terminal equipment (DTE). This lets a straight-through cable be used for most set-ups.

If a different type of cable is used to connect the PGMR to the host computer, a null modem adapter (shown below) may be required to match the cable to the EVS terminal port connector.

A null modem adapter reverses the roles of various data and control signals to make a DTE device appear as a DCE device, or vice versa.

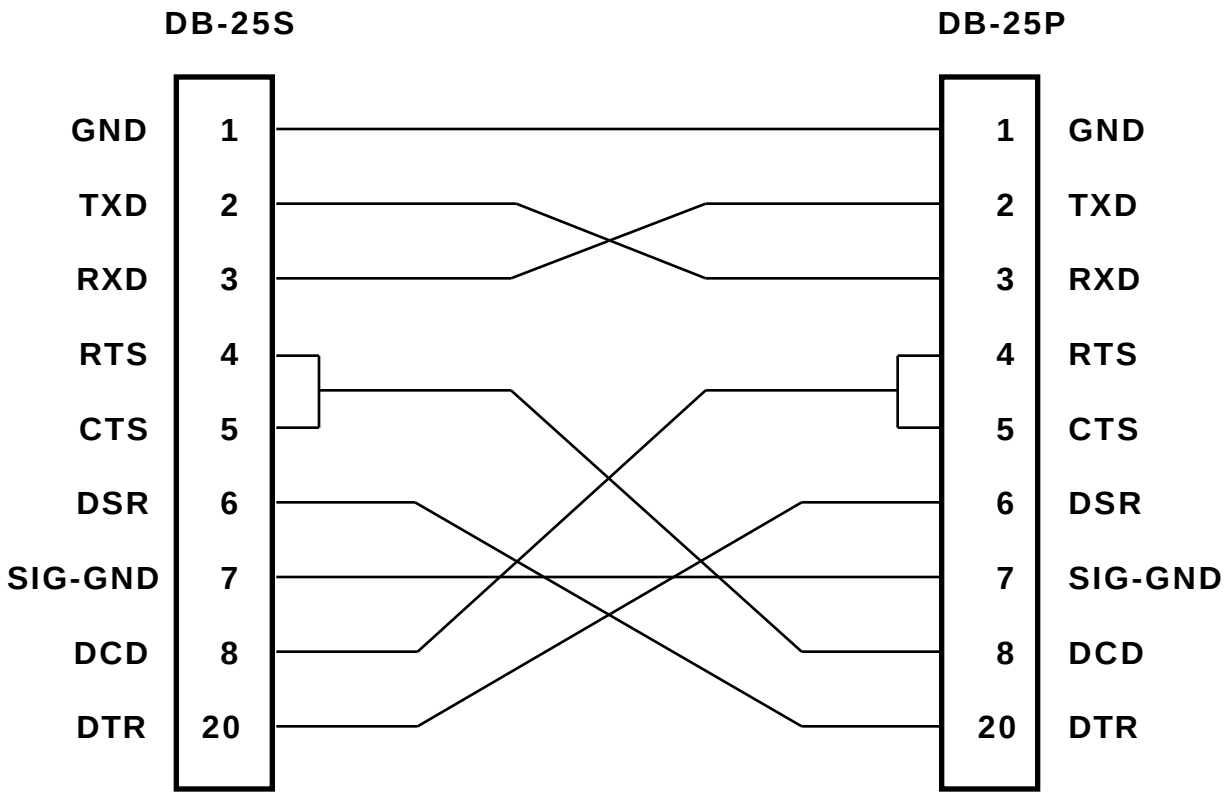

FIGURE A-2 Null Modem Adapter

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